

B3 16. The process of Claim 15, wherein said solution/  
dispersion of vegetable protein is heated during steps (a) and  
(b).

In line 1 of each of Claims 2, 4, 5, and 8, change "Claim 1"  
to -- Claim 15 -- .

Cancel Claim 3, 7, 10 and 14.

#### REMARKS

Claims 2, 4-6, 8, 9, 11-13, 15 and 16 are now in the case.

Claim 1, 3, 7, 10 and 14 have been cancelled.

No Claims have been allowed.

#### The Amendments.

The specification has been amended to incorporate language  
from column 3, lines 15 and 22-24 of the Tomasula patent, U.S.  
Patent No. 5,432,265, which was incorporated by reference on page  
4, line 20, of the application. In a batch process contemplated  
by the invention of the application, carbon dioxide is introduced  
and released from the headspace of a treatment vessel, inherently  
resulting in maintenance of the protein particle size. This is  
evident from the discussion on page 6, lines 15 to 20, and from  
the Example on pages 10 and 11. The fact that protein must be  
scraped from the batch reactor is an indication that the protein

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particle size, formed upon precipitation, is maintained. If a continuous reactor is used as disclosed in Tomasula '265, special attention is given to gradual pressure reduction, such as by use of a reverse high pressure pump 7 shown in FIGS. 1 and 2 of the patent. Amendment to the specification as indicated above simply clarifies that the gradual pressure reduction is required for maintaining particle size, whether the claimed process is conducted in a batch reactor vessel or in a continuous reactor.

Independent Claim 1 has been rewritten as Claim 15 to emphasize the significance of the holding step (b) and the gradual pressure <sup>reduction</sup> ~~deduction~~ step (c). Support for the "at least 1 minute" holding period limitation is found on page 7, lines 10 and 11. Support for gradually depressurizing the solution/dispersion in order to maintain particle size is found on page 7, line 16 et seq.

The amendments made herein are necessitated at this time in order to clarify the distinction of the claimed invention from the teachings of the newly-applied Dahlstrom reference. Applicant submits that these amendments will place the case in condition for allowance. Entry thereof is respectfully requested.

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**The Rejection under 35 U.S.C. §103(a).**

Claims 1-14 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Dahlstrom et al. taken with Tomasula '265. Withdrawal of this rejection is requested for the following reasons.

Dahlstrom teaches treating a protein-containing fluid stream, such as milk (col. 3, lines 22-39), with a food grade acid stream (col. 3, lines 49-65). The protein and acid streams are forced together through a restricted orifice under high pressure (as in a Sonalator®, see Examples) to create extreme turbulence and promote dispersing of the ingredients (col. 4, lines 13-20). The role of the acid is to reduce the pH of the protein below the isoelectric point, and thereby precipitate a curd. Applicant acknowledges that one of the acids contemplated by Dahlstrom is carbonic acid.

There are several differences between the claimed invention and the teachings of Dahlstrom. <sup>Covered In Prior Art</sup> **Firstly, the Applicant requires the introduction of carbon dioxide, not carbonic acid.** Even though a portion of the carbon dioxide becomes carbonic acid under the pressures applied in step (a), the gas is used to create and control the pressurization and pH reduction. Carbonic acid cannot be used to create and sustain the required pressures of 400 psi to 800 psi. The pressures obtained in the Sonalator®-

type reactor of Dahlstrom are the result of pumps (e.g. 14 and 24, FIG. 1) and are instantaneous (see col. 5, lines 2 and 3, and 9-14). Carbon dioxide could not be substituted for the carbonic acid of Dahlstrom because the rapid pressure drop at orifice 26 would cause the CO<sub>2</sub> to freeze, blocking the orifice. **Secondly,** Dahlstrom does not have a holding step (particularly a holding step of at least 1 minute) as required by step (b). This holding step is important to Applicant's process for the development of large curd particles. Because the Dahlstrom process is designed for instantaneous pressurization and immediate coagulation, it would not be obvious to modify that process to include a holding step. **Thirdly,** Applicant requires in step (c) a gradual depressurizing in order to maintain the particle size of the protein coagulum produced in holding step (b). In Dahlstrom, the aqueous protein precipitate exits orifice 26 as a high pressure jet stream (paragraph bridging cols. 3 and 4). The combination of rapid pressure drop and the impingement of the protein curd upon the edge of blade 30 will cause substantial disruption of the protein particles. The specific combination of steps employed by Applicant, in conjunction with the specific sequence of those steps, account for a curd quality that cannot be obtained by the process of Dahlstrom. The larger particle size obtained by Applicant's process reduces loss of product during

*New Issue*

*Taught by Tomasula*

recovery and is important for the ingredients market which is not amenable to use of "fines".

④ Tomasula ('265) is primarily directed to the precipitation and removal of milk protein (predominantly casein) from aqueous media. Reference to vegetable material (col. 4, lines 50-55) is only in the context of sterilization of vegetable pieces. There is no mention of concentrating vegetable protein, which may be any one or more of several specific proteins, such as gluten, glutenin, zein, glycinin, and gliadin. These proteins each have specific solubility properties and isoelectric points. There is no suggestion in Tomasula that a solution/dispersion of a vegetable protein can be precipitated by pressurized carbon dioxide in order to yield a recoverable curd. Therefore, even if the teachings of Dahlstrom and Tomasula were combined as urged by the Examiner, the person of ordinary skill in the art would still not be led to the claimed invention.

**Summary.**

Applicant has rewritten independent Claim 1 to further delineate the differences between the invention and the teachings of the applied art in response to the new ground of rejection. Applicant has pointed out several critical differences between the process of the claims the process of Dahlstrom, and also between the process of Dahlstrom as modified by Tomasula.

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For the reasons advanced above, Claims 2, 4-6, 8, 9, 11-13, 15 and 16 are deemed to be in condition for allowance and a favorable action on the merits of the case is earnestly solicited.

Respectfully submitted,

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